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GEOMETRIC PRINCIPLES FOR CONSTRUCTING RADAR PANORAMAS OF THE SURFACE OF VENUS

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In 1983-1984 the automated interplanetary stations (AMS) Venera 15 and Venera 16 made radar maps of the planet Venus. The synthesized images are the basic initial material for photogrammetric and cartographic processing to create maps of Venus's surface. The geometric laws for generating radar images have to be known for photogrammetric work when making coordinate reference of images and producing a map. /48*

A special combination of equipment, furnished with a computer, was created and appropriate methods developed for processing reflected signals and synthesizing radar images and altitude profiles of the surface at the USSR Academy of Sciences Institute of Radio Engineering and Electronics (IRE). When radio signals reflected from the surface of Venus were received, all of the data aboard the AMS were grouped by arrays. Each array corresponds to its point in time when a signal was sent from the radio transmitter; signals ensued in 0.3 sec. After processing, each data array represents a separate frame of a radar image of a terrain area located at a scattering point illuminated by radio waves. At the moment the signal is sent, the surface elements in this spot are at different distances from the station and have different speeds relative to it.

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HYPSOMETRIC FEATURES OF THE MOON AND TERRESTRIAL PLANETS

Zh. F. Rodionova and K. I. Dekhtyareva

The purpose of this article is to compare the hypsographic curves /56 of the Moon and terrestrial planets, drawn both for the entire surface as a whole and for individual hemispheres, and to discover the common consistencies and individual features in the distribution of hypsometric levels. The most complex task is to discover the reasons for some character of distribution in altitude levels, since there is, as yet, no unified opinion, even on the origin of the Earth's topography.

The Moon

The topography of the visible side of the Moon is shown on a large number of maps, but because the reference systems do not agree, it remains difficult to assess even the topographic features of large /57 formations. The hypsometric map of the topography of the visible side of the Moon [1] is drawn up relative to the center of mass in Goloseyevo. The nature of the topography of the other side of the Moon can be judged by the laser altimeter profiles from the Apollo 15, 16, and 17 KA [spacecraft] [2, 3] and by materials from the AMS [automated interplanetary stations] Zond 6 and 8 [4, 5]. About 35% of the Moon's surface has no elevation marks. Topographical maps of the Moon's entire surface were drawn by Bilz and Ferrari [6] by expanding altitude characteristics by spherical functions to 12th-order harmonics, and by N. A. Chuykova [7] by spherical and sample-distribution functions to the 8th order.

For global analysis of the features of the distribution of altitude levels over the entire surface of the Moon, we employed a map [6] drawn relative to a 1737.5-km-radius sphere with the center of mass of the Moon as the center. The isohypses traced on the map [6] through 1 km were transfered to a complete map of the Moon on a 1:10,000,000 scale [8], according to which the areas occupied by different altitude levels were measured.

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